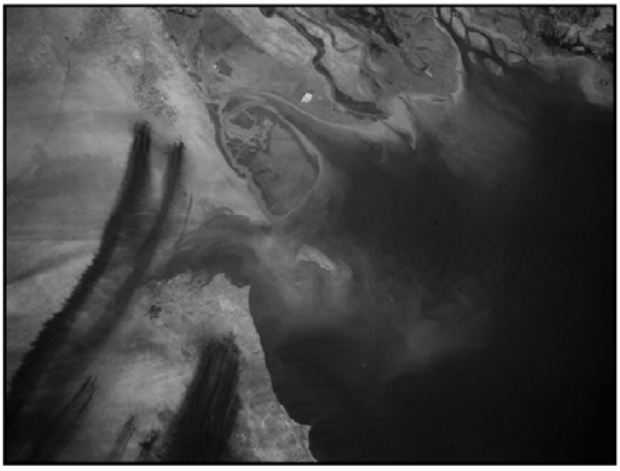
Presentation 2 – Lea Steele

What Do We Know About Oil Well Fires and the Health of Gulf War Veterans?

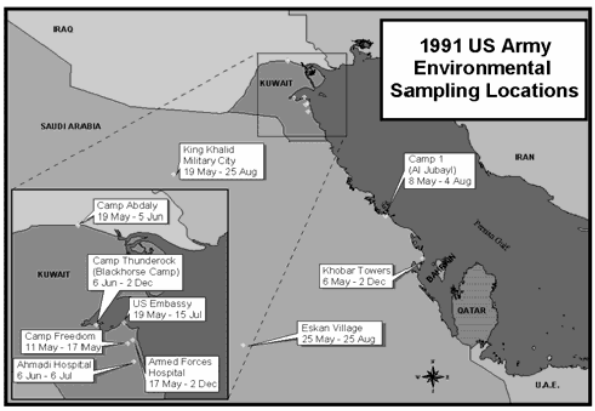
Overview and Review

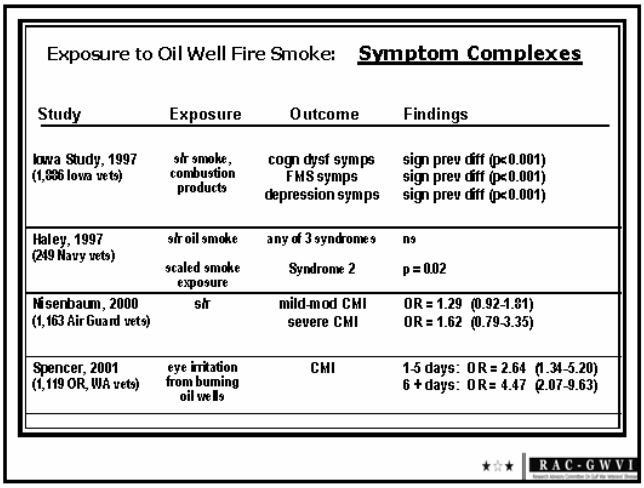
Lea Steele, Ph.D.



Toxicants Found in Oil Fire Smoke

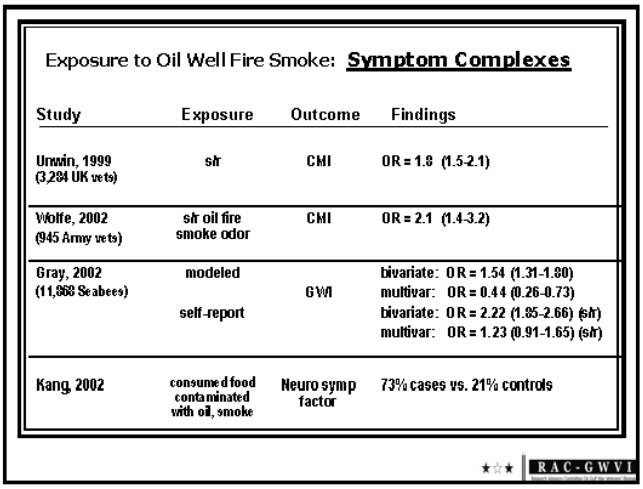
- Ozone (O_3)
- Nitrogen Dioxide (NO_2)
- Sulfur Dioxide (SO_2)
- Carbon Monoxide (CO)
- Hydrogen Sulfide (H_2S)
- VOCs: Volatile organic compounds *(benzene, toluene, etc)*
- PAHs: Polycyclic aromatic hydrocarbons *(anthracene, pyrene,etc)*
- Metals *(cadmium, chromium, lead, nickel, mercury, vanadium)*
- Acidic gases/aerosols *(hydrochloric acid, nitric acid, sulfuric acid)*
- Particulate matter *(PM_{10}, $PM_{2.5}$, ultrafine particles)*





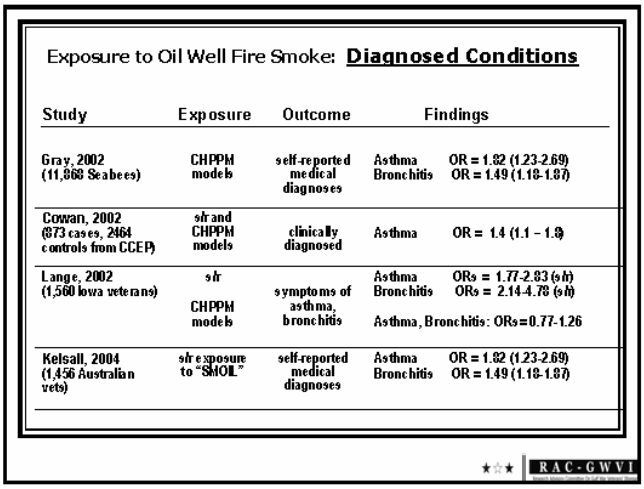
Exposure to Oil Well Fire Smoke: **Symptom Complexes**

Study	Exposure	Outcome	Findings
Iowa Study, 1997 (1,886 Iowa vets)	s/r smoke, combustion products	cogn dysf symps FMS symps depression symps	sign prev diff (p<0.001) sign prev diff (p<0.001) sign prev diff (p<0.001)
Haley, 1997 (249 Navy vets)	s/r oil smoke scaled smoke exposure	any of 3 syndromes Syndrome 2	ns p = 0.02
Nisenbaum, 2000 (1,163 Air Guard vets)	s/r	mild-mod CMI severe CMI	OR = 1.29 (0.92-1.81) OR = 1.62 (0.79-3.35)
Spencer, 2001 (1,119 OR, WA vets)	eye irritation from burning oil wells	CMI	1-5 days: OR = 2.64 (1.34-5.20) 6 + days: OR = 4.47 (2.07-9.63)



Exposure to Oil Well Fire Smoke: **Symptom Complexes**

Study	Exposure	Outcome	Findings
Unwin, 1999 (3,284 UK vets)	s/r	CMI	OR = 1.8 (1.5-2.1)
Wolfe, 2002 (945 Army vets)	s/r oil fire smoke odor	CMI	OR = 2.1 (1.4-3.2)
Gray, 2002 (11,868 Seabees)	modeled self-report	GWI	bivariate: OR = 1.54 (1.31-1.80) multivar: OR = 0.44 (0.26-0.73) bivariate: OR = 2.22 (1.85-2.66) (s/r) multivar: OR = 1.23 (0.91-1.65) (s/r)
Kang, 2002	consumed food contaminated with oil, smoke	Neuro symp factor	73% cases vs. 21% controls



Exposure to Oil Well Fire Smoke: **Diagnosed Conditions**

Study	Exposure	Outcome	Findings
Gray, 2002 (11,868 Seabees)	CHPPM models	self-reported medical diagnoses	Asthma OR = 1.92 (1.23-2.69) Bronchitis OR = 1.49 (1.18-1.87)
Cowan, 2002 (873 cases, 2464 controls from CCEP)	s/r and CHPPM models	clinically diagnosed	Asthma OR = 1.4 (1.1 – 1.9)
Lange, 2002 (1,560 Iowa veterans)	s/r CHPPM models	symptoms of asthma, bronchitis	Asthma ORs = 1.77-2.83 (s/r) Bronchitis ORs = 2.14-4.78 (s/r) Asthma, Bronchitis: ORs=0.77-1.26
Kelsall, 2004 (1,456 Australian vets)	s/r exposure to "SMOIL"	self-reported medical diagnoses	Asthma OR = 1.92 (1.23-2.69) Bronchitis OR = 1.49 (1.18-1.87)

Summary of Epidemiologic Findings: General Points

- Results differ by how exposure is assessed
  - Self reported: yes/no vs. graded exposures
  - Self-reported exposure vs. modeled exposure
  - Unadjusted vs. adjusted estimates (possible confounding)
- Results differ by health outcome of interest
  - Respiratory symptoms, other defined symptoms types
  - Multisymptom illness complexes
  - Diagnosed medical conditions

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Summary of Epidemiologic Findings

- 65-80% of Gulf vets report some exposure to oil fire smoke during deployment; duration and intensity vary
- 30% report eating food contaminated with oil or smoke

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Summary of Epidemiologic Findings

- Among veterans who served in the Gulf War, exposure to oil fire smoke associated with:
  - Short-term respiratory symptoms
  - Diagnosed and self-reported asthma (ORs~1.4 - 2.8)
  - Chronic multisymptom conditions (ORs~1.5 - 4.5) (possible dose-response effect—proximity and duration)

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Oil Well Fires and the Health of Gulf War Veterans: Remaining Questions

- Is Gulf War-related multisymptom illness linked to exposure to smoke from oil well fires?
  - *As single exposure?*
  - *As a result of interaction with other exposures?*
- Are increased rates of asthma or other diagnosed conditions associated with exposure to oil well fire smoke?
- Are there additional health concerns for military personnel located very close to burning wells for an extended period?

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